WHAT IS CLAIMED IS:

1. A method for manufacturing a microfluidic chip with electroosmotic flow (EOF) controlled by inducing an electric field through an insulating self-assembled monolayer (SAM), comprising at least one step of combining a top plate and a bottom plate; wherein said bottom plate has a gate electrode on an upper surface thereof and said insulating SAM formed on said gate electrode; and said top plate has an elongate micro channel groove which is narrower than that of said gate electrode, recessed in a lower portion thereof and filled with a buffer solution;

said method is characterized in forming said SAM on said gate electrode by immersing said bottom plate in a solution of a chemical material to obtain said SAM through interaction of said gate electrode and said chemical material; and

Accordingly, the flowing direction and the flowing velocity of said EOF are controlled by supplying high voltage to two ends of said micro channel groove to produce an electric field for driving EOF and supplying an inducing voltage to said gate electrode.

2. The method as claimed in claim 1, wherein said chemical material is an alkanoic acid and said gate electrode contains metal cations on surface thereof.

3. The method as claimed in claim 1, wherein said chemical material is organosilicon derivatives and said gate electrode contains hydroxyl group on surface thereof.

4. The method as claimed in claim 1, wherein said chemical material is organic sulfur and said gate electrode is transition metal so as to form said SAM by adsorption.

5. The method as claimed in claim 1, wherein said chemical material is alkyl and said gate electrode contains silicon on surface thereof so as to form said SAM by adsorption.

6. The method as claimed in claim 1, wherein said solution for immersion is made by mixing said chemical material in pure alcohol (99.5%) to obtain a 2 mM solution.

7. The method as claimed in claim 1, wherein said bottom plate is immersed in said solution for 18-24 hours.

8. A method for manufacturing a microfluidic chip with electroosmotic flow (EOF) controlled by inducing an electric field through a self-assembled monolayer (SAM), comprising at least one step of combining a top plate and a bottom plate; wherein said bottom plate has a gate electrode on an upper surface thereof and said insulating SAM formed on said gate electrode; and said top plate has an elongate micro channel groove which is narrower than that of said gate electrode, recessed in a lower portion thereof and filled with a buffer solution;

Said method is characterized in that said SAM is formed with an alkanoic acid and metal cations on a surface of said gate electrode;

Accordingly, the flowing direction and the flowing velocity of said EOF are controlled by supplying high voltage to two ends of said micro channel groove to produce an electric field for driving EOF and supplying an inducing voltage to said gate electrode.

9. A method for manufacturing a microfluidic chip with electroosmotic flow (EOF) controlled by inducing an electric field through a self-assembled monolayer (SAM), comprising at least one step of combining a top plate and a bottom plate; wherein said bottom plate has a gate electrode on an upper surface thereof and said insulating SAM formed on said gate electrode; and said top plate has an elongate micro channel groove which is narrower than that of said gate electrode, recessed in a lower portion thereof and filled with a buffer solution;

Said method is characterized in that said SAM is formed with an organosilicon derivative and hydroxyl function groups on a surface of said gate electrode; and

Accordingly, the flowing direction and the flowing velocity of said EOF are controlled by supplying high voltage to two ends of said micro channel groove to produce an electric field for driving EOF and supplying an inducing voltage to said gate electrode.

10. A method for manufacturing a microfluidic chip with electroosmotic flow (EOF) controlled by inducing an electric field through a self-assembled monolayer (SAM), comprising at least one step of combining a top plate and a bottom plate; wherein said bottom plate has a gate electrode on an upper surface thereof and said insulating SAM formed on said gate electrode; and said top plate has an elongate micro channel groove which is narrower than that of said gate electrode, recessed in a lower portion thereof and filled with a buffer solution;

Said method is characterized in that said SAM is formed by adsorbing organic sulfur on said gate electrode made of transition metal;

and

Accordingly, the flowing direction and the flowing velocity of said EOF are controlled by supplying high voltage to two ends of said micro channel groove to produce an electric field for driving EOF and supplying an inducing voltage to said gate electrode.

11. A method for manufacturing a microfluidic chip with electroosmotic flow (EOF) controlled by inducing an electric field through a self-assembled monolayer (SAM); comprising at least one step of combining a top plate and a bottom plate; wherein said bottom plate has a gate electrode on an upper surface thereof and said insulating SAM formed on said gate electrode; and said top plate has an elongate micro channel groove which is narrower than that of said gate electrode, recessed in a lower portion thereof and filled with a buffer solution;

Said method is characterized in that said SAM is formed by adsorbing alkyl groups on said gate electrode made of silicon; and

Accordingly, the flowing direction and the flowing velocity of said EOF are controlled by supplying high voltage to two ends of said micro channel groove to produce an electric field for driving EOF and supplying an inducing voltage to said gate electrode.